REMARKS

Claims 1-15 are currently pending in the Application. In an office action dated March 26, 2004 ("Office Action"), the Examiner rejected claims 1-15 under 35 U.S.C. § 103(a) as being unpatentable over Yonetsu et al., U.S. Patent No. 6,506,513 ("Yonetsu"), in view of either Olson, U.S. Patent No. 4,967,595 ("Olson") or Kamin, U.S. Patent No. 4,700,580 ("Kamin"). Applicant's representative respectfully traverses these new rejections.

In the current application, Applicant describes one embodiment of the present invention in paragraph [0016] as follows:

> In one embodiment, a float is suspended in a methanol-water solution contained in the anode reservoir, or a float chamber in fluid communication with the anode reservoir, and is visible through a transparent window. Normal operation of the fuel cell lowers the concentration of methanol in the methanol-water solution within the anode reservoir. As the concentration of methanol decreases, the density of the methanol-water solution increases. The float, having a density intermediate between the density of water and methanol, continuously rises from a lower position to a higher position as methanol is consumed and the density of the methanol-water solution increases. Thus, the position of the float corresponds to the concentration of methanol in the methanol-water solution. A fuel scale may be included to facilitate methanol concentration determination based on the float position in the methanol-water solution. (emphasis added)

Applicant illustrates the embodiment in Figure 2A, describing the illustration in paragraphs [0017-0019] as follows:

> Figure 2A illustrates one embodiment of the present invention with a density-based fuel indicator in direct contact with the anode reservoir. The anode reservoir 202 includes a long, thin vertical window 204 visible from the exterior of the fuel cell. A fuel scale 206, affixed to the exterior of the fuel cell, extends along the vertical length of the window 204. The fuel scale 206 is shown as a vertical line with a series of evenly spaced marks, each mark representing a fuel concentration.
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> Figure 2A shows a float 208, suspended in fluid of a particular density, visible through a window 204 in the anode reservoir 202. The float 208 utilizes a horizontal fuel indicator bar 210 to facilitate fuel concentration determination. The position of the fuel indicator bar 210 corresponds to a percentage of available fuel remaining. In Figure 2A, the position of the float 208 corresponds to a methanol concentration at which 87% of the available fuel supply remains.
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> In the above-described embodiment, shown in Figure 2A, the float is contained directly inside the anode reservoir. (emphasis added)

Finally, Applicant clearly claims, in claim 1:

1. A fuel cell comprising:

an anode where fuel is oxidized;

a cathode where oxygen is reduced;

an anode reservoir that contains a fuel solution and the anode; and

a float *responsive to fuel solution density* immersed in a volume of fuel solution that serves as a fuel-concentration indicator. (emphasis added)

The Examiner cites Yonetsu as teaching a fuel cell on which all elements but the final element of claim 1 read. The Examiner then cites Kamin and Olson as disclosing "a fuel tester comprising a volume of fuel solution having a floater responsive to the density of the fuel solution immersed in the volume of fuel solution." However, the Examiner has, in Applicant's representative's respectfully offered opinion, mischaracterized the fuel testers disclosed in Olson and Kamin. Applicant's representative has particular experience with such fuel testers, because Applicant's representative is a former pilot, and well understands the principles of the disclosed fuel testers, having a Ph.D. in biochemistry with a graduate minor in chemistry. First, and foremost, there is no fuel solution disclosed in either Kamin or Olson. Gasoline, aviation fuel, and jet fuel neither dissolve in, nor are miscible with, water. Water is not a fuel for airplanes. The floats in both Kamin and Olson are designed to float at specific densities to indicate, by relative position, whether or not water contamination is present in the fuel tester, and, in the case of Olson, whether the fuel is gasoline or kerosene.

In Olson, two floats having different specific gravities (32 and 34 in Figures 1-3) occupy different relative positions depending on the contents of the fuel tester. If the fuel tester contains water, both floats float at the surface of the liquid contents of the fuel tester, as shown in Figure 2. If the fuel tester contains less dense gasoline, then both floats sink to the bottom, as shown in Figure 3. If the fuel tester contains jet fuel, denser than gasoline but less dense than water, the less dense float 32 floats at the surface, while the denser float sinks to the bottom (Olson, column 3, line 59 to Olson, column 4, line 3). Olson makes no mention of a fuel solution, and Olson's floats are not designed to serve as, and do not serve as, fuel-concentration indicators, as clear claimed in claim 1 for Applicant's invention.

In Kamin, an octagonal float is designed to "sit at the interface between the water 10 and the gasoline 9" (Kamin, column 2, lines 47-48). Again, gasoline and

water are neither soluble in one another nor miscible. There is no fuel solution. There is an interface between fuel and the contaminant water. Kamin's float is designed to sit exactly at the interface between the fuel and the water contaminant, to make the interface even more visually evident to a fuel tester user. Kamin's float is not responsive to fuel solution density, because, again, there is no fuel solution.

Applicant's float is responsive, in a described embodiment, to the density of the methanol/water fuel solution in a fuel cell reservoir. Methanol and water are mutually soluble in one another. As the methanol is consumed by the fuel cell, the methanol/water fuel solution changes in density, approaching the greater density of water as all the methanol is consumed. The float thus moves continuously to different positions within the fuel solution as the fuel solution density continuously changes with consumption of methanol. Neither Kamin nor Olsen mention or suggest a float responsive to fuel solution density. In both Kamin and Olson, the floats are designed to position themselves at interfaces – either the surfaces of liquids, the bottom of a fuel tester, or at the interface between fuel and water. They are specifically designed to not be responsive to small changes in the density of fuels, but to instead occupy the desired interface position with respect only to, in the case of Olsen, the type of fuel and any water contaminant, and, in the case of Kamin, the interface between fuel and a water contaminant.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

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